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GHRM as a strategic driver of sustainable outcomes: an AMO framework perspective from Pakistan

Abstract

Research background and purpose: The research aims at exploring the role of green human resource management (GHRM) initiatives on individual and organizational level outcomes; green organizational citizenship behavior (OCBE) and green reputation (GR) within the Pakistani corporate environment. This study explored how constructs such as environmental strategy (ES), green organizational culture (GOC), green transformational leadership (GTFL) and green perceived organizational support (GPOS) were related to GHRM. The research contributed significant evaluation of the adoption of GHRM initiatives to enhance sustainability and foster employees' involvement in eco-friendly practices.

Design/methodology/approach: Responses were collected from 210 managers serving across different corporations in Pakistan. Partial least squares structural equation modelling (PLS-SEM) SmartPLS V4 was employed to examine the data collected.

Findings: The findings of the study indicated the application of GHRM strategies to have positive association with employee pro-environmental behaviors and a company's GR. Findings also revealed positive association of GPOS with employee engagement and OCBE with diminished moderating capacity on the association between GHRM and its organizational outcomes.

Value added and limitations: The findings of this research contributed valuable insights into the positive relationship between GHRM, GR and OCBE in the context of Pakistan's corporate sector utilizing the theoretical lens of AMO (Ability-Motivation-Opportunity). The results from SEM analysis indicated significant statistical ranges among the relationships between the constructs. This research is limited to the corporate sector of Pakistan and does not extend to other sectors within and outside the country, which limits the study's external validity. Additionally, the study's limitations suggest that it should be conducted using a longitudinal approach with an increased number of respondents in future research to boost the findings generalizability.

Keywords: *green human resource management practices; AMO (Ability-Motivation-Opportunity); green organizational citizenship behavior; green reputation; eco-friendly practices*

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1. Introduction

Sustainability is becoming a necessity in business and the contemporary world. Businesses must balance their work features with sustainable operations, which are essential elements in the development of business strategies (Kaizen Institute, n.d.). The regulatory frameworks developed by global governments, including the Paris Agreement and the Green Deal of the European Union (EU) confirm the necessity of companies to act sustainably to achieve global environmental objectives (Grinevich et al., 2019).

Corporate sustainability is a strategic challenge that is gaining high priority in most businesses as environmental concerns and the need to fight climate change continue to gain wider recognition. This scenario is attracting industry practitioners and scholars in the field of green business conduct. It could be described as a type of corporate behavior that promotes environmental sustainability (Katz et al., 2022).

It is also becoming an essential component of the contemporary corporate strategy because of the pressure on companies by their stakeholders, such as customers, shareholders and regulators, to become more responsible in terms of their corporate environmental performance. Cost reduction programs have been viewed as companies' main strategy in undertaking environmental conservation projects. Sustainability initiatives should also be incorporated for employees who have introduced these practices. By comprehending the reasons why employees are willing to work on green projects, organizations are able to improve their performance in the realization of the UN SDGs for entire development into a more environmentally sustainable corporate culture (Knowles et al., 1999).

Green human resource management involves the systematic adoption of environmental sustainability in human resources programs and activities and therefore allows corporations to match their human resource strategy with their ecological goals. The strategy entails the inculcation of green values in recruitment, training, performance measurement and employee interaction to facilitate environmentally friendly behaviors. GHRM not only reduces an organization's influence on the climate but also contributes to a business's image and competitive position in the global market. Incorporating the idea of sustainability into HR activities enables the corporations to become more resilient and innovative over the long run, thereby meeting their environmental responsibilities (Omolo, 2025).

Employee practices are linked to recruitment, training, and reward systems aimed at enhancing employees' knowledge and future outlooks regarding the company's environmental conditions. GHRM converts organizational environmental targets into organizational policies and protocols to ensure that human resources make the most significant contributions to sustainability (Mishra, 2017). The procedures also motivate workers to participate in sustainability activities, thereby improving organization's green reputation and green organizational citizenship behavior.

The analysis of context introduces the idea of green organizational culture as the GHRM antecedent. It entails an organizational culture system characterized by a set of organized values, norms, attitudes and environmentally friendly behaviors. A green culture enables people in an organization to embrace environmental principles through environmental awareness and sensitivity (Gao et al., 2025; Shafaei et al., 2020).

Environmental strategy is a vital aspect of GHRM, which is defined as a long-term plan that organizations adopt in an attempt to reduce their environmental impact and promote environmentally friendly practices. This includes policies of resource use, conservation, pollution control and sustainable production. It is essential to include the ES in the company's objectives and missions since ecological issues may ultimately affect the organization (Bakhsh Magsi et al., 2018).

The third antecedent of GHRM in the study's framework is Green Transformational Leadership. GTFL is the transformational leadership behavior that guides employees in their responsibility to treat the environment. Top management leads by example and promotes the goals of environmental friendliness so that sustainability awareness is created at the organizational level (Özgül & Zahir, 2021). This strategy also promotes green measures among workers, which is in line with the Ability Motivation Opportunity theory contributing to a motivating vision on sustainability plans within the organization. It is also closely associated with the operational part of GR to improve the green image of the organization.

In a bid to comprehend the psychological aspects that motivate GHRM, the moderating role of green perceived organizational support on the association between GHRM and its results; OCBE and GR is examined. GPOS inspires employees to engage in sustainability activities since it enhances their dedication to the firm's environmental priorities (Aramaeen et al., 2022). It acts as an important mechanism in enabling employees to have a feeling of support on the issue of green practices. It is strongly linked to the results of GHRM.

OCBE is the extra-role behavior, which is directed by the self-orientation of the employees and entails participation of employees in an environmentally responsible behavior. These aspects are not within the job specifications and are considered to support the organization's sustainability performance. OCBE describes the degree to which the employees show pro-environmental behaviors like reducing waste disposal, conserving energy and advocating environmental conservation among others within the organization (Malik et al., 2021).

Green reputation is the belief that the public key stakeholders hold towards the level of environmental responsibility of organizations. Therefore, a good green image is an invaluable resource that strengthens the organization's competitive position and generates consumer interest and trust in the firm's environmental accountability (Wang et al., 2023).

The current study looks at the extent of GHRM and its influence on behavioral and organizational level consequences, such as green organizational citizenship behavior and green reputation. The emphasis is on GHRM practices in promoting organizational sustainability, changing an organization's environmental profile and promoting employee attitudes of environmentally awareness.

An analysis of the current body of literature on GHRM suggests that future researches should explore how employees exceed work expectations to adopt sustainable workplace practices by examining the connections between GHRM and its antecedents, which include GOC, ES and GTFL. Also, OCBE and GR implicate as individual and organizational level outcomes of GHRM (Hossari & Elfahli, 2022). To overcome these limitations, the current research utilizes the theoretical lens of the AMO theory, as evident in the extant literature on GHRM (Appelbaum, 2000).

Pakistan is a key context for GHRM research due to its institutional and environmental challenges. Pakistan is among the countries most vulnerable to climate-related risks and has responded through initiatives such as the National Climate Change Policy (2021), Pakistan Environmental Protection Act (1997) and Sustainability Reporting Guidelines (SECP). Despite these frameworks, enforcement and organizational adoption of sustainability practices remain uneven making Pakistan a relevant context for examining GHRM implementation.

The existing body of research has found limited empirical evidence to support GHRM practices in South Asian contexts. Despite the finding that supports growing global attention to GHRM has been limited in South Asia, especially focusing on integration of organizational antecedents, behavioral consequences and moderating factors. Therefore, this research becomes a new resource offering context-related insights on the functioning of the GHRM in a developing economy making the AMO framework more applicable in contexts outside of conventional studies (Sarmad et al., 2023).

Following are the research questions of the study:

RQ1: How do GOC, ES, and GTFL influence the adoption of GHRM practices?

RQ2: What is the association of GHRM practices with OCBE and GR?

RQ3: Does GPOS moderate the association between GHRM and its outcomes (OCBE and GR)?

RQ4: Does GHRM mediate the relationships between GOC, ES, GTFL and its outcomes (OCBE and GR)?

The research objectives of the current research are as following:

RQ1 To investigate the association of GOC, ES and GTFL on the adoption of GHRM practices.

RQ2. To analyze the association of GHRM practices with OCBE and GR.

RQ3. To investigate the moderating role of GPOS in the association between GHRM and its outcomes (OCBE and GR), within the framework of the AMO theory.

RQ4. To examine the mediating role of GHRM in the relationships between GOC, ES, GTFL and its outcomes of OCBE and GR.

2. Literature review

The extant literature emphasizes the adoption of environmental practices as a key organizational objective, necessitating identification via HRM practices support. Green behavior among employees can be defined as a certain kind of environmentally friendly behavior in the workplace. There are diverse activities that the employees undertake to lessen the ecological footprint of their organization. Recent studies have demonstrated that the GHRM practices are highly conducive to OCBE as it incorporates sustainability within workforce management activities including hiring and employee development and performance evaluation (Dilchert & Ones, 2012).

Collectively, these studies imply that GHRM is a systemic process that merges values of the environment into organizational practices. The degree to which these practices result in discretionary processes among employees depends on motivational and contextual factors.

As investigated by Pal et al. (2025), green passion acts as an intermediary between the HRM practices and the environmental citizenship, which underscores the importance of the intrinsic motivation of employees in changing the HR policies into eco-friendly activities done voluntarily.

In Bangladeshi banks, Kamrun (2025) discovered that green organizational culture mediates the association between GHRM and organizational citizenship behavior regarding environmental sustainability. The values and norms of the organization multiply the outcome of the HRM initiatives on the voluntary environmental behaviors of the employees, which proves that formal HRM systems are the basis, whereas OCBE is the voluntary, people-oriented aspect that enhances the chances of generating sustainable results.

Together, these results suggest that the success of GHRM does not only appear to be based on formal HR practices but instead on how individual motivation interacts with organizational context, making it necessary to establish a more comprehensive theoretical perspective.

Green organizational culture is a topic that is debated by the general community and affluent population (Mirahsani et al., 2024). The key consideration of the green culture is the balance of the ecology. It is an environmental and social methodology that demands the implementation of an environmentally oriented culture which facilitates ecological

progress and enduring sustainability in the economy through science, aesthetics and politics, as witnessed by (Galpin et al., 2015).

Globalization has facilitated diverse economies to benefit from environmentally friendly practices and embed them in their corporate culture. An empirical study supports notion for companies to re-evaluate their corporate environment to include new components related to environmental concerns, ethics and the culture. GOC is the basis to embrace the GHRM practice, since research indicates that incorporation of corporate sustainability values into the culture of an organization will enhance the effectiveness of the HR policies that will facilitate the promotion of eco-friendly behavior (Khan et al., 2025). This is an indication that organizational culture should not only be perceived as a background condition but rather a key enabler, which determines the effectiveness with which GHRM practices are instilled and internalized by employees.

The environmental strategy of a corporation is an approach that deals with the association between the functioning of a company and ecological sustainability (Aragón-Correa & Sharma, 2003). An active corporate environmental policy constitutes a set of environmental targets, visions, initiatives and procedures intended to preventing the detrimental ecological consequences and exceeding the minimum standards of environmental legislation (Ateş et al., 2012).

In 1995, Hart's study was grounded on the Resource-Based View with the inclusion of natural resources as necessary resources to attain strategic goals. According to the NRBV, the firms that aim at sustainable growth should have strategic assets and capabilities that are unique and eventually leading towards the desired results (Hart, 1995). Studies have indicated the relevance of the proactive approach to the ES to strengthen organizational effectiveness and its competitiveness in the market.

A meta-analytic study conducted by Bindeeba (2025) revealed that companies employing GHRM practices demonstrate higher green innovation rates and sustainable performance metrics as compared to those that don't. It facilitates the conversion of abstract environmental policies into concrete, implementable projects which lead to resource efficiency, waste reduction and product lifecycles. The opponents argue that the introduction of GHRM would introduce new management duties, hence distracting the managers from the core business activities and potentially minimizing some of the anticipated benefits.

In spite of the apprehensions, the evidence indicates that if GHRM is incorporated successfully, it can serve as one of the factors to transform environmental efforts into measurable ecological and economic returns. However, regardless of this evidence, the literature is split between the possibility of trade-offs between environmental actions and managerial efficiency, so it may require future empirical confirmation in different contexts (Haile & Singh, 2026)

The green leadership approach of transformational leadership discussed by Luo et al (2024) is important in entrenching sustainability in HRM. This enhances employee dedication towards environmental objectives, ultimately increasing the impact of GHRM in achieving lasting results. As discovered by Alkandi (2025), integrating leadership with GHRM can improve employee environmental performance through incentives and onboarding processes.

Green transformational leadership (GTFL) possesses attributes that may efficiently manage the interplay between corporation's strategy and management of human resources through cultivation of environmentally conscious workforce and environmentally conscious behavior (Robertson & Barling, 2013). This highlights the role leadership playing as a mediating force between the strategic environmental targets and the behavioral outcomes on the employee level.

According to Aboramadan & Karatepe (2021), perceived green organizational support encourages employees to adopt eco-friendly practices, which in turn improves the firm's reputation. Adapting the original organizational support theory to focus on environmental issues results in the development of GPOS.

The concept of green organizational citizenship behavior has three dimensions; eco-helping, eco-civic engagement and eco-initiatives. Eco initiatives such as recycling and pollution prevention can foster stronger environmental outcomes. At the same time, several studies indicated employees' voluntary participation in pro-environmental practices and initiatives, including events and committee memberships (Terrier et al., 2016).

Al-Romeedy and Alharethi (2025) identified that GHRM activities are enhanced through green organizational identity and innovation, which significantly boost the green reputation of companies in the tourism and hospitality industries. An organization's environmental accountability is demonstrated through its GR, which is shaped by external perceptions. HRM policies appear to have a two-fold impact, as they promote internal sustainability while also influencing external legitimacy. Being affiliated with an organization can increase potential employees' self-esteem and improve the organization's reputation. Job applicants prefer companies that adopt GHRM because they are perceived to have environmental concerns. This association can strengthen prospective employees' sense of self-worth and improve the organization's reputation.

Existing literature has greatly highlighted the importance of GHRM studies with emphasis on developed economies, whereas empirical data in a developing economy context like Pakistan is scarce (Ullah et al., 2024). Secondly, despite the current literature recognizing the importance of the GHRM in promoting pro-environmental behaviors, there is a lack of knowledge on how the main organizational antecedents, such as green organizational culture, environmental strategy and green transformational leadership

influence the GHRM practices under a unified framework (Li et al., 2024). Additionally, the literature regarding the moderating effect of green perceived organizational support in strengthening or weakening the relation between GHRM and its results, specifically green citizenship behavior and green reputation, has not been well-explored nor conclusive (Sarmad et al., 2023).

To address these gaps, this study applies theoretical lens of AMO to examine how organizational factors shape GHRM practices and influence individual and organizational sustainability outcomes. It is posited as the mechanism fostering employees' abilities, motivation and pro-environmental behavior. The proposed model analyzes both mediating and moderating relationships and this integrated approach allows a more complex perspective of GHRM processes, which have been separately studied in the previous researches (Arshad, 2023).

2.1. Development of hypotheses

Based on the previous assertions, following key propositions are formulated and a research framework is proposed:

- H1. Green Organizational Culture contributes positively towards GHRM practices.*
- H2. Environmental Strategy is positively associated with GHRM.*
- H3. Green Transformational Leadership demonstrates a positive relationship with GHRM.*
- H4. GHRM shows a positive relationship with Green Organizational Citizenship Behavior.*
- H5. GHRM fosters creation of Green Reputation.*
- H6. Green Perceived Organizational Support acts as a moderator between the relationship of GHRM and Green Organizational Citizenship Behavior.*
- H7. Green Perceived Organizational Support moderates the relationship between GHRM and Green Reputation.*
- H8. GHRM mediates the relationship between Green Organizational Culture, Environmental Strategy, Green Transformational Leadership and (a) Green Organizational Citizenship Behavior.*
- H9. GHRM mediates the relationship between Green Organizational Culture, Environmental Strategy, Green Transformational Leadership and (b) Green Reputation.*

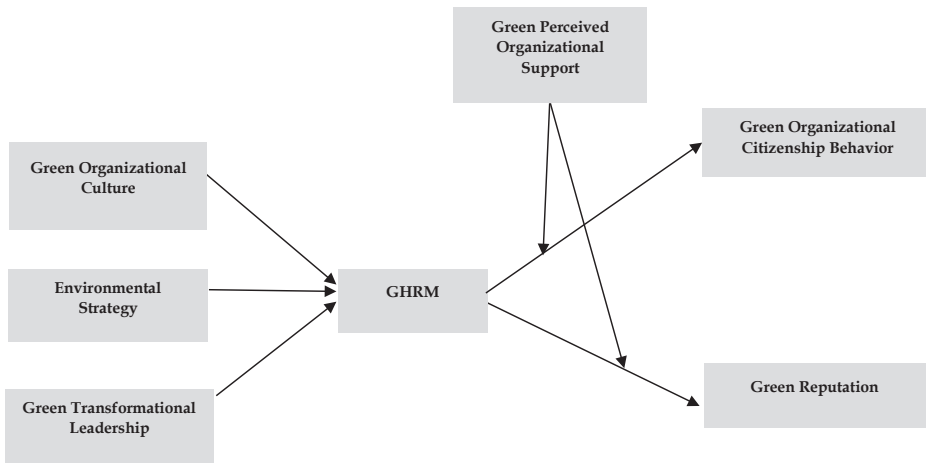


Figure 1. **Conceptual framework**

Source: authors' own study

2.2. Theoretical frameworks

The theoretical basis of the research comprises of two main strands of AMO: one strand focuses on identifying variables that contribute to individual performance, while the other strand examines the organizational impact of AMO factors. Though less common, a third existing stream combines variables at both the personal and corporate levels (Mbukanma & Strydom, 2022).

The following framework posits that ability, motivation and opportunities together determine performance, as shown in Table 1. Ability refers to physiological and cognitive capacities (knowledge, skills and competencies) necessary to execute responsibilities. Motivation is the impulse that drives and guides behavior which reflects an employee's willingness to accomplish tasks. Opportunity encompasses context-dependent factors outside an individual's control that either enable or constrain performance (Renwick et al., 2013).

Table 1. Mapping of study's constructs to the Ability–Motivation–Opportunity (AMO) framework

Construct	AMO dimension
Green Human Resource Management (GHRM)	Ability, Motivation, and Opportunity
Green Transformational Leadership (GTFL)	Motivation
Green Organizational Culture (GOC)	Opportunity
Environmental Strategy (ES)	Opportunity
Green Perceived Organizational Support (GPOS)	Opportunity
Green Organizational Citizenship Behavior (OCBE)	Individual-Level Outcome
Green Reputation (GR)	Organizational-Level Outcome

Source: own study

3. Research methods

The current research utilized an exploratory and explanatory research design to determine different degrees of the association between GHRM initiatives and its outcomes. Furthermore, the study responds to the existing gap by offering empirical insights on the factors influencing GHRM initiatives and business practices, which is accompanied by employee behavior in a corporate setting.

A purposive sampling method was adopted to select respondents from corporate organizations in Pakistan. The participants were chosen from a sample of 210 mid-level managers with emphasis in companies that have already implemented GHRM best practices or are in the process of adopting them. The sample was drawn from a combination of multinational and national corporations.

The module participants ranged from Gen Z (18-26 years) to Gen X (43 and above) and the majority of participants possessed 1–10 years of professional experience. Purposive sampling was employed in order to get participants with relevant experience and knowledge of implementing GHRM practices and their resultant organizational implications.

The respondents were drawn from large national and multinational corporations including pharmaceuticals, FMCG, textiles, cement, fertilizers and oil and gas sectors. Participants occupying managerial and operational roles were contacted through organizational contacts and professional networks to ensure adequate knowledge of sustainability initiatives, environmental practices and HRM systems.

The data was obtained via an online survey targeting middle-level managers within the targeted companies. The questionnaire was completed using a Likert scale that ranged from strongly disagree (1) to strongly agree (5), focusing on various aspects of GHRM initiatives, organizational culture, leadership, strategy and green behaviors. The survey was divided into distinct sections; the first section examined GHRM, the next part examined GTFL, the third part dealt with GOC, the fourth part covered ES, the fifth part focused on GPOS, the sixth part was OCBE and the final part was GR.

A total of 250 questionnaires were distributed of which 210 usable responses were obtained, representing a response rate of 84%. To assess potential non-response bias, respondents were divided into early and late response groups following (Armstrong & Overton, 1977). Independent-samples t-tests revealed no significant differences between the groups across the study constructs ($p > 0.05$), indicating that non-response bias was unlikely to affect the findings. The complete survey instrument and measurement items are provided in the Appendix.

The 10-times rule and the statistical power analysis were used to evaluate the minimum sample size. According to the 10-times rule, the lowest possible sample size was estimated as ten times the largest number of structural paths to a latent construct, which in this case was three, which gave a minimum possible sample size of 30 (Wagner & Grimm, 2023).

Moreover, a statistical power analysis was done in G*Power with a medium effect size ($f^2 = 0.15$), a significance level of 0.05 and statistical power of 0.80. The analysis revealed that the sample size required was at least 77. Thus, the overall sample size of 210 respondents is more than the recommended thresholds, which ensures that the statistical power and model estimation are sufficient and robust. This provides a reliable basis for the study's investigation of the relationships (Hair, 2014).

Variables adopted in the study were GHRM, ES, GOC, GPOS, GR, GTFL and OCBE. The definition of GHRM was established as the various processes and activities undertaken by the HRM department with an eye on the embedding of sustainable management systems at the workplace about the four strategic HRM practices; namely, recruitment, training, compensation, and performance management.

As identified by GOC, the principles included the values and measures of the environment within the culture of the organization. GPOS encompass private sector employees' attitudes on the extent the organization supports environmental initiatives. Perceived environmental credibility and reputation of the organization was used to measure GR while GTFL referred to the extent of leadership support for green work behaviors. At last, all the items loaded in the factor OCBE were concerned with voluntary behaviors that were positively associated with the organization's environmental impact.

Harman's single-factor test was conducted using an unrotated principal component analysis. The first factor accounted for 22% of the total variance, below the recommended

threshold of 50% indicating that common method bias was not a serious concern (Howard et al., 2024). The collected data was analyzed with the use of Smart PLS V4; it is a flexible tool for the analysis of complex relationships in theoretical models with latent variables. SEM was used to find out the total effects of GHRM initiatives on the levels of GR and OCBE moderated by GPOS. It paid attention to the values such as path coefficients and R-square. It examined the hypothesis on the link between the constructs.

The study addressed ethics by informing participants about its content and guaranteeing the confidential treatment of participant data. Each subject was briefed on the objectives of the research and its voluntary participation. Participants' responses did not contain identifying information and their answers remained anonymous.

4. Results and analysis

The coefficient of internal consistency, Cronbach's Alpha has been computed to check the reliability of the constructs used in study and a highly satisfactory value has been obtained for all seven constructs as shown in Table 2.

Table 2. **Measurement model reliability**

Variables	Cronbach's alpha	Composite reliability	Average Variance Extracted (AVE)
ES	0.713	0.839	0.642
GHRM	0.841	0.880	0.512
GOC	0.733	0.823	0.483
GPOS	0.711	0.808	0.518
GR	0.705	0.819	0.532
GTFL	0.716	0.805	0.516
OCBE	0.702	0.812	0.520

Source: own study

Out of all the variables, GHRM had the highest reliability where the Alpha was 0.841 which indicated a very high internal consistency. The other constructs comprising ES (0.713), GOC (0.733), and GTFL (0.716) also provided acceptable reliabilities signifying that the measures reliably capture the intended constructs. GPOS was computed to be 0.711 and GR was 0.705 while both are within the acceptable range of retest reliability, there is a reasonable opportunity to slightly improve the scales in future studies. OCBE is viewed here with an Alpha of 0.702 and again can be deemed more reliable with slight

modifications. All the constructs fulfilled the necessary criterion of the SEM, although GHRM was slightly higher than other variables; GR, GPOS, and OCBE also appeared to be very reliable for further analyses.

In all models, Cronbach's Alpha was computed and the composite reliability of all the constructs was obtained and tested. It was higher than 0.70 which was acceptable. Based on the analysis, GHRM had the highest reliability of 0.880, thus representing well-developed measures. GOC (0.823), ES (0.839), GPOS (0.808), GR (0.819), GTFL (0.805) and OCBE (0.812) also had relatively higher reliability, making the constructs valid. In this study, the results provided support for an adequate measurement model in capturing such latent variables.

The items of Environmental Strategy had the highest AVE value (0.642), which means that they account for a large percentage of the variance of the construct. Therefore, Green Reputation (0.532), Green Transformational Leadership (0.516), Green Organizational Citizenship Behavior (0.520), Green Human Resource Management (0.512) and Green Perceived Organizational Support (0.518) exceeded the threshold of 0.50 hence signifying adequate convergent validity. Moreover, the AVE value of GOC (0.483) is slightly less than the recommended value of 0.50. However, since its composite reliability is higher than 0.70, the construct can be treated as acceptable in the exploratory research (Hair et al., 2022). Nevertheless, the AVE value below the recommended threshold shows that the indicators of GOC may not adequately represent the construct's variance. Therefore, the relationships involving GOC should be interpreted with some caution and future studies may consider refining the measurement scale to improve convergent validity.

Discriminant validity tests carried out using the Fornell-Larcker criterion which support the study because all the AV values in the diagonal were higher than the inter-construct correlation coefficients as shown in Table 3.

Table 3. Discriminant validity by Fornell-Larcker criterion

	ES	GHRM	GOC	GPOS	GR	GTFL	OCBE
ES	0.801						
GHRM	0.404	0.715					
GOC	0.593	0.565	0.695				
GPOS	0.287	0.471	0.257	0.720			
GR	0.400	0.461	0.541	0.350	0.729		
GTFL	0.253	0.458	0.316	0.306	0.230	0.719	
OCBE	0.332	0.303	0.214	0.374	0.292	0.428	0.721

Source: own study

These concrete notions were measured by the Heterotrait-Monotrait (HTMT) coefficients which checked whether the constructs exhibited differences in terms of discriminant validity as presented in table 4. For all the constructs, the values were less than 0.85 which signified sufficient discriminant validity. This reassured the factors in the theoretical model of the study were respectively measurable and were different, thus strengthening the validity of the measurement model.

Table 4. Discriminant validity by Heterotrait-Monotrait ratio (HTMT)

	ES	GHRM	GOC	GPOS	GR	GTFL
ES						
GHRM	0.484					
GOC	0.800	0.691				
GPOS	0.395	0.582	0.361			
GR	0.573	0.573	0.756	0.465		
GTFL	0.355	0.504	0.393	0.350	0.324	
OCB	0.428	0.353	0.353	0.467	0.415	0.549

Source: own study

The values of VIFs concluded that there were no problems of multicollinearity among the constructs of the proposed research model as shown in table 4. Each of the values is below the conventional 5 or 10, which confirms that the constructs were indeed distinct from one another. For instance, the VIF for GHRM, GR and GPOS were 1.324, 1.615, and 1.322 respectively; implying significant range. Furthermore, the numbers of VIF of the interaction terms GPOS*GHRM and GPOS*mod equals 1.112, thus indicating no issues of multicollinearity in this model. This indicates stability in the relations of the latent variables in the model and therefore the model is fit for analysis.

The outer weights presented point to the extent of the impact of each indicator on its respective latent variable in the established model. These weights reflect the absolute that a particular item contributes to the explication of its construct. For instance, the factor loading for ES1 represented a higher statistical value of the Environmental Strategy with a value of 0.507 than other items measuring the same construct. As in the case of GHRM, GHRM1 had a high weightage comprising a higher actual weight of 0.281, while GHRM 9 had a very low weightage and an actual weight equal to 0.152.

The values of weights of Green Organizational Culture vary from 0.229 (GOC3) to 0.338 (GOC1) and therefore, GOC1 was the most influential factor in this construct. Out of the items in the investigation, GPOS had consideration to GPOS1 (0.527) hence showing the significance of the aspect in the construct while the least is vested in GPOS4 (0.139). Regarding Green Reputation (GR), all the indicators had fairly close weights varying from 0.330 to 0.374 indicating that all the indicators were of importance in defining the construct.

The analysis of weight also showed that GTFL1 had the highest weight of 0.505, which means that GTFL1 was the most important while GTFL2 had the lowest weight of 0.174. If the weight assigned to Green Organizational Citizenship Behavior was considered, it emerges that the first item (OCBE1) had the highest weight of 0.498 while the last item (OCBE7) had the lowest weight of 0.254. These weights give an overall sense of how these indicators fit in the formation of the latent constructs and aid in validating the model by pointing out which items best represent the constructs.

4.1. Measurement and structural models

The standard path coefficients provided insights into the relationships between the variables as shown in Figure 2.

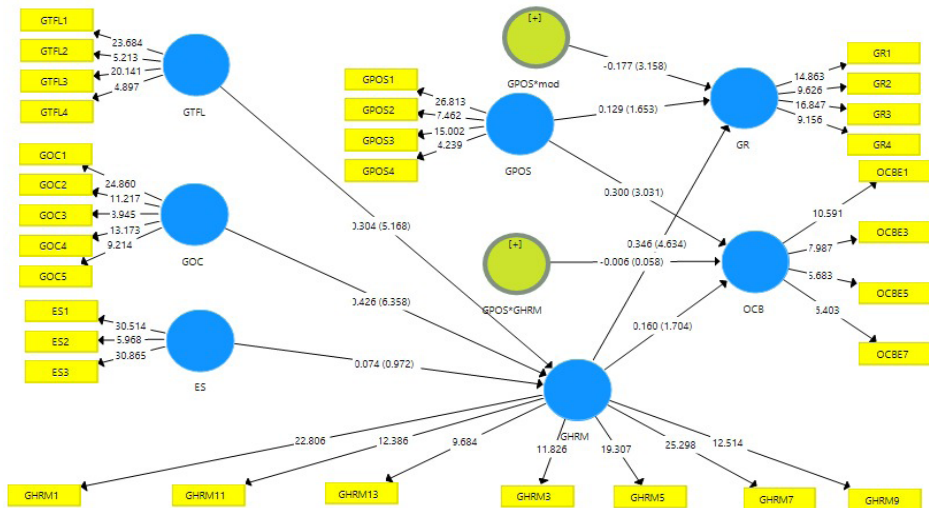


Figure 2. Structural equation model (PLS SEM)

Source: own study

ES had insignificant direct relationship with GHRM which is 0.075, therefore, the provision of environmental strategies may not compel organizations to adopt GHRM practices. Nonetheless, there is an apparent and statistically significant relation between GOC and GHRM; the coefficient was 0.425 which means that maintaining a green culture in the organization was helpful to embrace green HR practices. The relation between GHRM and GR was also positive at 0.342, hence showing that the implementation of GHRM practices had an association with increasing the company's reputation on its environmental impact. GHRM showed a positive but statistically insignificant relationship with OCBE ($\beta = 0.160$, $p = 0.088$). Therefore, H4 was not supported.

As for the moderation effects, the results indicate that GPOS increases the level of OCBE (0.295), meaning that if an employee expects that organization supports greening initiatives, he/she shall behave more environmentally friendly. The coefficient estimated for the interaction term between GPOS and GHRM (-0.008) is so low and negatively signed therefore, suggesting that the joint effect of both these variables on OCBE was insignificant. Also, the moderating effect of GPOS for GR was insignificant and negative (-0.177), so it is evident that GPOS does not associate with the relationship between GHRM and GR.

Furthermore, GTFL had a moderate level of a positive association with the GR with a coefficient of 0.305, which indicates that GTFL incorporates green practices to enhance the organization's GR. Therefore, the direct relationship between GHRM and GR as well as OCBE was positive; the moderating effects were relatively low.

Table 5. Path coefficients, T-statistics, and P-values for the structural model relationships

	Original sample (O)	Sample mean (M)	Standard deviation (STDEV)	T statistics (O/STDEV)	P values	Hypotheses
ES -> GHRM	0.074	0.081	0.076	0.972	0.331	Not Supported
GHRM -> GR	0.346	0.356	0.075	4.634	0.000	Supported
GHRM -> OCBE	0.160	0.162	0.094	1.704	0.088	Not Supported
GOC -> GHRM	0.426	0.426	0.067	6.358	0.000	Supported
GPOS -> GR	0.129	0.136	0.078	1.653	0.098	Not Supported
GPOS -> OCBE	0.300	0.318	0.099	3.031	0.002	Supported
GTFL -> GHRM	0.304	0.310	0.059	5.168	0.000	Supported

GPOS*GHRM -> OCBE	-0.006	-0.016	0.104	0.058	0.954	Not Supported
GPOS*mod -> GR	-0.177	-0.165	0.056	3.158	0.002	Not Supported
Model Fit						
SRMR	0.097	0.110				
d_ ULS	4.653	6.037				
d_ G	1.485	1.583				
Chi-Square	1,565.512	1,624.656				
NFI	0.483	0.463				

Source: own study

This Table 5 represents the results of path analysis and assesses the relationships of the study's variables to one another. The regression analysis of the paths examines the association of ES with GHRM and therefore, indicates that there is little interaction (coefficient = 0.074, $p = 0.331$), meaning that even on theoretical level, ES can be related with GHRM in the framework of study but it is statistically insignificant. GHRM was positively associated with GR ($\beta = 0.346$, $p < 0.001$), indicating a statistically significant relationship. GHRM showed a positive association with OCBE ($\beta = 0.160$, $p = 0.088$). However, the relationship was not statistically significant therefore, H4 was not supported. In addition, the link between GHRM and GR is moderately positive and significant, which may indicate that an optimal level of GHRM practices is positively associated with the improvement of the organization's environmental standing.

On the other hand, the relationship between GHRM as the independent variable and OCBE as the dependent variable is positive but not statistically significant ($p = 0.088$). It is also proven how the GOC has a significant relationship with GHRM stating that the path is highly significant (coefficient = 0.426, $p = 0.000$). There is also evidence of a causal relationship between GPOS and OCBE, while it has only a weak effect on GR; GPOS coefficients = 0.300; $p = 0.002$; GR coefficients = 0.129; $p = 0.098$.

The last two analyses show the moderating effects of GPOS*GHRM for OCBE equals 0.954 and GPOS*mod for GR equals 0.002. It demonstrates that although GPOS is not significant to moderate the link between GHRM and OCBE, it is significant to moderate GHRM and GR. Furthermore, the results show that GTFL has a positive association with GHRM (0.304, $p = 0.000$), meaning that leadership associates with GHRM practices. The observations on the fit of the estimated model portray a moderate or adequate fit to the data employed for the model construction.

The model fit indices indicate a moderate rather than a strong fit as SRMR value of 0.110, which was slightly above the ideal value of 0.08. The results show that although the value of d_{ULS} depicting the deviation of the estimated model was slightly higher than the observed value, the d_G was also very close to 1, indicating a good fit. The estimated model with a Chi-Square of 1,624.656 was little more than the saturated model Chi-Square, 1,565.512, implying the model was well-approximated. The NFI value was 0.463, which is below the commonly recommended threshold of 0.90. This represents a limitation of the study. The analysis of these findings makes the estimated model valid with some discrepancies (Hair et al., 2022).

Furthermore, the findings reveal that H1, H3 and H5 were supported whereas, H2 and H4 were not supported. The moderating effects (H6, H7) and the mediation effects (H8, H9) were partially supported.

The level of explanation of the dependent variables by independent variables was demonstrated by the R Square values as shown in Table 6.

Table 6. Table for R square and adjusted R square values

	R square	R square adjusted
GHRM	0.409	0.400
GR	0.274	0.262
OCBE	0.161	0.148

Source: own study

Regarding GHRM, the R Square value of 0.409 presented about 41% of the outcome variation of GHRM as explained by the model, which was moderate as presented in Table 6. GR in this case had an R Squared of 0.274 meaning that the model accounts for 27.4% of the variance of GR. OCBE holds the lowest value of R Square equal to 0.161, which means that the selected predictors and OCBE had a moderate relationship as 16.1% of the variance of OCBE which could be accounted for the model.

The Adjusted R Square values signify that the degrees of freedom were considered due to the number of predictors in the model and also depict the same trend as those described under R-Square with a little variation, making it majorly appropriate to infer that the current model was a moderate fit for GHRM and a weak fit for GR and OCBE with adjusted R square of 0.400 for GHRM, 0.262 for GR and 0.148 for OCBE. These results imply that the model contributed a great deal to the measure of GHRM. However, the predictors explain as smaller measure of GR and OCBE.

Table 7. **Specific indirect effects of key variables**

	Specific indirect effects	<i>t</i> value	<i>P</i> - value
ES -> GHRM -> GR	0.026	0.882	0.378
GOC -> GHRM -> GR	0.145	3.689	0.000
GTFL -> GHRM -> GR	0.104	3.611	0.000
ES -> GHRM -> OCBE	0.012	0.688	0.492
GOC -> GHRM -> OCBE	0.069	1.681	0.093
GTFL -> GHRM -> OCBE	0.049	1.558	0.119

Source: own study

Table 7 reveals the indirect effects, which give an insight into the mediating effect of GHRM. The findings reveal that GHRM plays a significant mediator in the relationships between GOC and GR ($\beta = 0.145$, $p < 0.001$) and GTFL and GR ($\beta = 0.104$, $p < 0.001$). Nevertheless, the influence of ES on GR is not statistically significant ($\beta = 0.026$, $p > 0.05$).

In contrast, all indirect effects related to OCBE are statistically non-significant, including those of ES ($\beta = 0.012$, $p > 0.05$), GOC ($\beta = 0.069$, $p > 0.05$) and GTFL ($\beta = 0.049$, $p > 0.05$). These results indicate that though GHRM is a good mediating factor that drives organizational-level performance like GR, it is not a significant mediator in the relationship between antecedent variables and discretionary employee behaviors (OCBE).

5. Discussion of research findings

The study offers valuable insights into how GHRM practices can contribute to individual and organizational-level sustainable outcomes within the context of a developing economy. GHRM was positively and significantly associated with GR ($\beta = 0.346$, $p < 0.001$). Its association with OCBE was positive but did not reach statistical significance ($\beta = 0.160$, $p = 0.088$). The results are generally in accordance with previous studies conducted at an international level, which emphasize the importance of GHRM in the improvement of organizational legitimacy and environmental image (Al-Romeedy & Alharethi, 2025; Wang et al., 2023).

Nonetheless, the slightly lower influence on OCBE implies that the transfer of HR practices to voluntary employee behavior may not be uniform across the context, especially in developing economies where the intrinsic motivation and environmental awareness might not be as institutionalized. This finding contrasts

with evidence from many developed economies, where stronger environmental regulations, greater stakeholder pressure and more mature sustainability systems facilitate the translation of GHRM practices into discretionary employee behaviors (Li et al., 2023). However, in Pakistan sustainability initiatives are still evolving and environmental practices may be implemented primarily to meet organizational requirements rather than being fully internalized by employees, which may explain the weaker relationship with OCBE.

Theoretically, these results resonate with the Ability-Motivation-Opportunity approach, which suggests that the organizational practices lead to employee performance that is better developed in terms of their capabilities, motivation and opportunities (Appelbaum, 2000). Based on this theory, the GHRM practices that include training and incentives seem to make the employees more competent in environmental areas of the organization, thus contributing to a better organizational image. However, the slight influence on OCBE suggests that other motivations or environmental factors are possibly needed to entirely stimulate discretionary environmental behaviors.

Additionally, GOC is a powerful predictor of GHRM adoption, which aligns with other empirical research findings in the world that underscore the organizational culture as the driving force behind sustainability efforts (Mirahsani et al., 2024). The result supports the hypothesis that cultural congruency is the key to instilling environmental value during HR practices, and implies that organizations within emerging markets have to focus more on cultural change and its transformation in addition to the official policy.

Conversely, the moderating effect of GPOS was not significant or consistent in relationships. This observation contradicts previous studies on the international level, where perceived organizational support is predominantly highlighted as a major pro-environmental behavior driver (Aboramadan et al., 2022). This difference may reflect contextual factors in developing economies, where employees often rely more on direct supervisory support and tangible organizational resources than on broader perceptions of organizational environmental commitment. Consequently, the influence of GPOS may be weaker than that reported in studies conducted in highly institutionalized sustainability environments. This prompts the need to review the boundary conditions within which GPOS is functional.

One of the major findings regarding the indirect effects of GHRM on OCBE was that no statistically significant relationship was found. This implies that GHRM might not be a major mediating factor between organizational antecedents and discretionary environmental behaviors. The outcome reveals that OCBE might rely more on personal values, intrinsic motivation or situational influences not related to established HRM practices.

Moreover, GTFL demonstrated a moderate positive association with GHRM and GR which is consistent with the world literature on the importance of leadership in fostering sustainability-focused behaviors (Alkandi, 2025; Luo et al., 2024). The observation highlights the significance of leadership-inspired motivation as part of the AMO system, which implies that leaders also play a key role in bringing strategic intent into reality via operational environmental practices.

Therefore, this study adds to the literature as it provides empirical evidence in a developing economy where institutional, cultural, and behavioral processes might not be similar to those generally found in developed settings.

6. Conclusions

The findings of the research led to the conclusion that GHRM is engaged in promoting sustainable practices in organizations, which enhances their environmental conditions and makes the employees engage in a more environmentally responsible behavior. The data were collected through a questionnaire and the authors entirely depended on the managers' responses, which may have been biased and could have affected the results' validity. However, the study's design is cross-sectional which minimizes the possibility of inferring causality or determining the relationship between GHRM practices and their long-term consequences. Moreover, the study fails to assess other variables that may specify whether the relationships between the outlined constructs are moderated or mediated. The theoretical gap of this study is an unexplored attitude in the past.

Additionally, this study looks into the perception of the human resources in an organization supporting green practices, thus filling the gap between the practices of GHRM, GR and OCBE. While GHRM was positively associated with OCBE, the relationship was not statistically significant in the present study. Finally, GPOS did not enhance the relationship between GHRM, GR and OCBE. Instead, more direct initiatives related to the organization's greening policies and practices should be considered. In addition, the NFI value was below the recommended threshold, suggesting that the overall model fit should be interpreted cautiously. Other factors may be investigated to identify potential mediator or moderator variables that associate with GHRM's ability to achieve sustainable impact. The AMO theory provides partial support to explain the relationship between GHRM practices and the environment.

Authors' contribution

H.R.A.: article conception, theoretical content of the article, research methods applied, conducting the research, data collection. **T.S.:** theoretical content of the article, research methods applied, conducting the research, analysis and interpretation of results. **A.J.:** research methods applied, conducting the research.

Declaration of Generative AI and AI-assisted technologies in the writing process

During the preparation of this work the authors did not use Generative AI and AI-assisted technologies in the writing process.

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Appendix

Variable (s) /source (scale adapted from)	No. of items	Scales employed
Green Human Resource Management (GHRM) Shaban (2019); Renwick et al. (2012)	14	Job-positions-in-our-organization-enable-involvement-in environmental-management activities Job positions in our organization enable the gain of knowledge about environmental management Job positions in our organization demand knowledge about environmental management Environmental performance of the organization attracts employees HR department of our organization prefers to hire employees that have environmental knowledge HR department selects employees considering environmental motivation in our organization All selection steps consider environmental questions in our organization Environmental training is considered as an important investment in our organization Environmental training is a priority in our organization HR department provides continuous, relevant, and effective environmental training programs HR department of our organization establishes a clear and special objective of green practice for each employee Our organization assesses employees' contributions to environmental management Public recognition rewards are established in our organization for environmental performance Monetary rewards are provided for environmental performance
Green Transformational Leadership (GTFL) Jia et al. (2018)	4	My leader inspires the organization members with the environmental plans My leader provides a clear environmental vision for the members to follow My leader gets the employees to work together for the same environmental goals My leader encourages the employees to achieve the environmental goals
Green Organizational Culture (GOC) Hussain et al. (2020)	5	Environmental aspect is considered as one of organizational priorities Organizational vision and mission statements include environmental improvement Top management communicate information and values of environmental management throughout the organization Top management develop punishment system and penalties for noncompliance in the environmental management Top management actively support environmental practices

Environmental Strategy (ES) Molina-Azorín et al. (2021)	3	History of implementation of environmental programs is solid in our organization Key performance indicators: air, waste, water, and energy are being considered in our organization Environmental performance/activities reporting structure is defined in our organization
Green Perceived Organizational Support (GPOS) Eisenberger et al. (2001)	4	The organization values my contribution to environmental management The organization really cares about my environmental goals and values The organization cares about my opinions on sustainability The organization takes pride in my accomplishments on environmental issues at work
Green Organizational Citizenship Behavior (OCBE) Podsakoff et al. (1990)	7	I voluntarily carry out environmental actions and initiatives in daily work activities I make suggestions to colleagues about how to protect the environment more effectively, even when it is not my direct responsibility I actively participate in environmental events organized in our organization I undertake environmental actions that contribute positively to the image of our organization I volunteer for projects, endeavors or events that address environmental issues in our organization I voluntarily give time to help my colleagues to take the environment into account in everything they do at work I encourage my colleagues to adopt more environmentally conscious behavior
Green Reputation (GR) Fombrun (1996)	4	I think that this organization can be regarded as a good standard of environmental management I think that this organization might be successful about environmental management I think that this organization might be well-established about environmental management I think that the reputation of this organization about environmental management might be strong